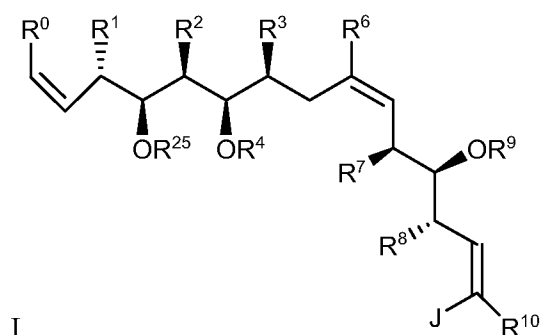


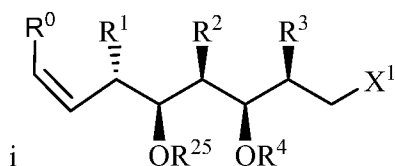
This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

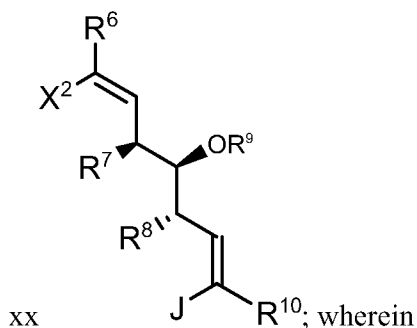
Claim 1 (original) A process for synthesizing a compound of formula I



comprising contacting a compound of formula i



with a compound of formula xx



$R^0$  is  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $(CH_2)_r(C_{3-6}$  cycloalkyl),  $(CH_2)_r$ (aryl) or  $(CH_2)_r$ (heterocycle), wherein  $r$  is 0, 1, 2, 3, or 4;

$R^1$ ,  $R^2$ ,  $R^3$ ,  $R^6$ ,  $R^7$ , and  $R^8$  are, independently, H or  $C_1$ - $C_{10}$  alkyl;

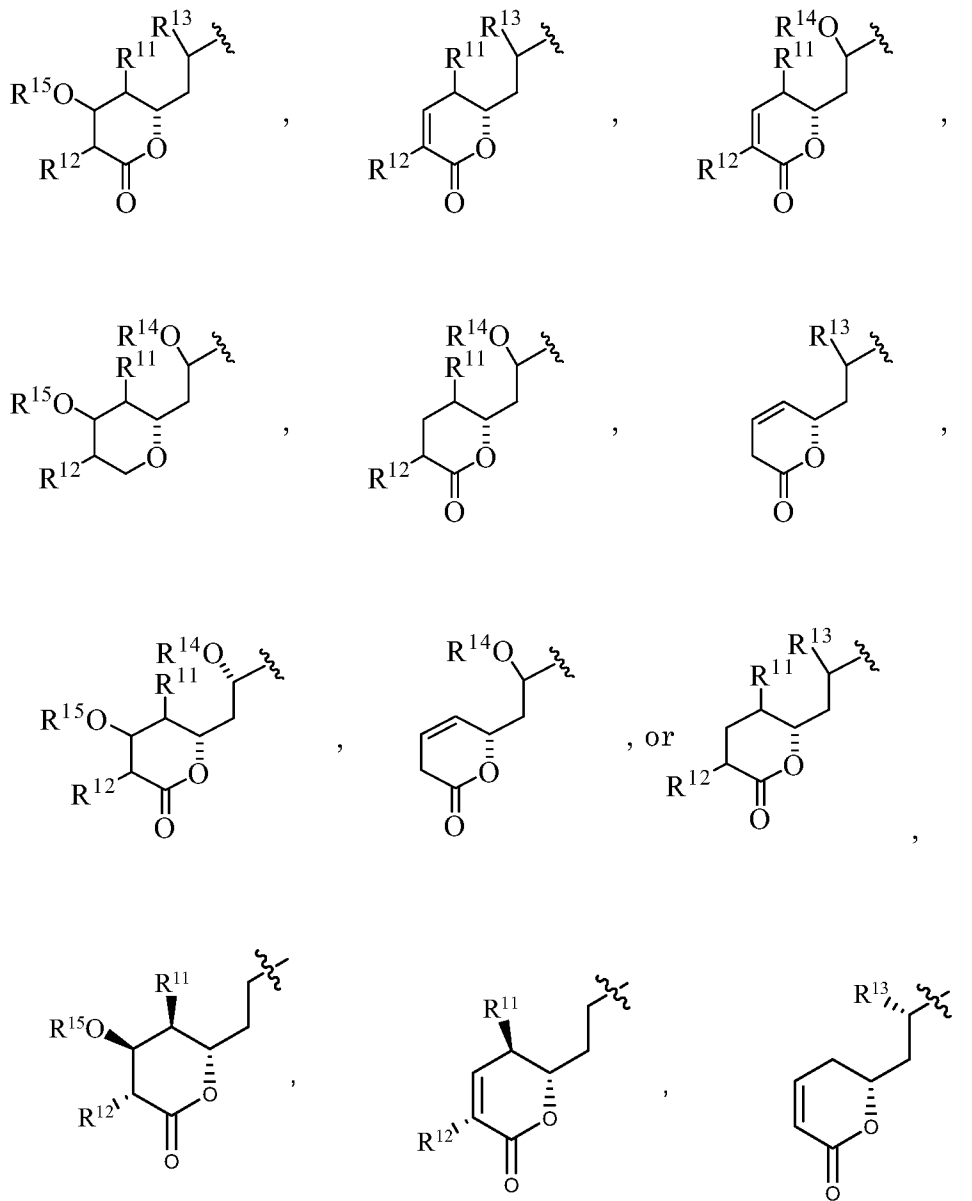
$R^4$  and  $R^9$  are, independently, H or an acid labile hydroxyl protecting group;

$R^{10}$  is hydrogen or  $C_1$ - $C_6$  alkyl;

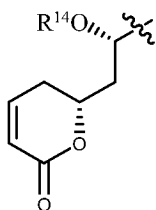
$R^{25}$  is hydrogen or an oxidation labile hydroxyl protecting group;

$X^1$  and  $X^2$  is, independently, a halogen, triflate, tosylate, or mesylate; and

J is



or



; wherein

$R^{11}$ ,  $R^{12}$  and  $R^{13}$  are each independently H or  $C_1$ - $C_{10}$  alkyl; and

$R^{14}$  and  $R^{15}$  are, independently, H or an acid labile hydroxyl protecting group.

Claim 2 (original) The process of claim 1, further comprising  
subjecting the process to a catalytically effective amount of a cross-coupling metal  
catalyst.

Claim 3 (original) The process of claim 2, wherein the cross-coupling metal catalyst  
comprises nickel or palladium.

Claim 4 (original) The process of claim 2, wherein the cross-coupling metal catalyst is  
Pd(0).

Claim 5 (original) The process of claim 2, further comprising contacting the  
compound of formula i with a metallating agent, wherein the metallating agent is a compound  
containing boron, zinc, tin, magnesium, or aluminum, or a combination thereof.

Claim 6 (original) The process of claim 5, wherein the metallating agent is a  
compound containing boron.

Claim 7 (original) The process of claim 5, wherein the metallating agent is MeO-9-  
BBN.

Claim 8 (original) The process of claim 5, wherein the metallating agent is a  
compound containing zinc.

Claim 9 (original) The process of claim 5, wherein the metallating agent is  $ZnCl_2$ .

Claim 10 (original) The process of claim 1, wherein at least one of  $X^1$  and  $X^2$  are iodo.

Claim 11 (original) The process of claim 1, wherein  $R^0$  is ethylenyl.

Claim 12 (original) The process of claim 1, wherein  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^6$ ,  $R^7$ , and  $R^8$  are, independently, H or  $C_1$ - $C_3$  alkyl.

Claim 13 (original) The process of claim 1, wherein  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^6$ ,  $R^7$ , and  $R^8$  are  $CH_3$ .

Claim 14 (original) The process of claim 1, wherein  $R^4$  and  $R^9$ , independently, are *tert*-butyldimethylsilyl, triethylsilyl, methoxymethyl, methylthiomethyl, 2-methoxyethoxymethyl, acetyl, benzyloxymethyl, 2-(trimethylsilyl)ethoxymethyl or allyl.

Claim 15 (original) The process of claim 1, wherein  $R^4$  is *tert*-butyldimethylsilyl.

Claim 16 (original) The process of claim 1, wherein  $R^9$  is methoxymethyl.

Claim 17 (original) The process of claim 1, wherein  $R^{10}$  is  $CH_3$ .

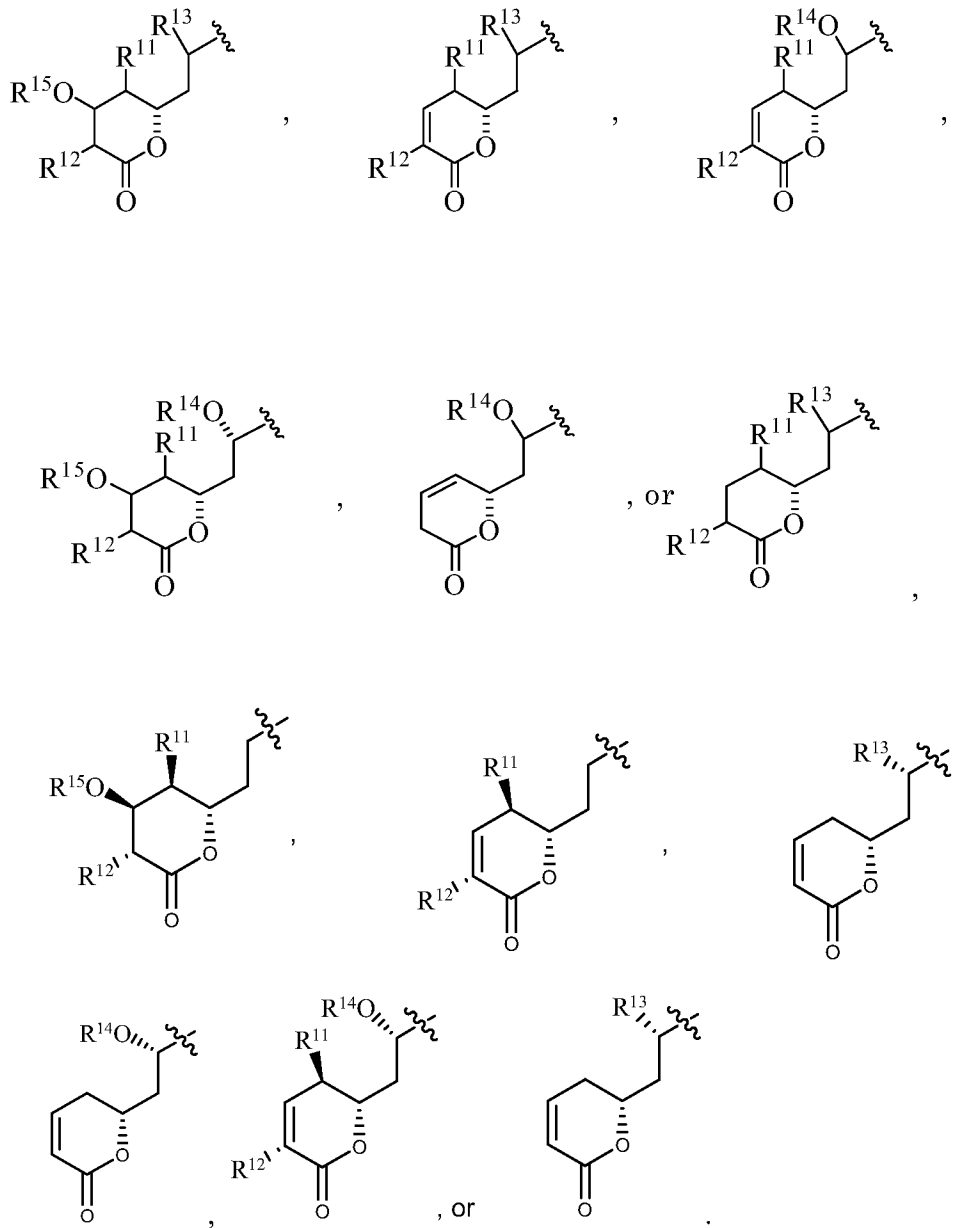
Claim 18 (original) The process of claim 1, wherein  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  are  $CH_3$ .

Claim 19 (original) The process of claim 1, wherein  $R^{14}$  and  $R^{15}$  are, independently, *tert*-butyldimethylsilyl, triethylsilyl, methoxymethyl, methylthiomethyl, 2-methoxyethoxymethyl, acetyl, benzyloxymethyl, 2-(trimethylsilyl)ethoxymethyl or allyl.

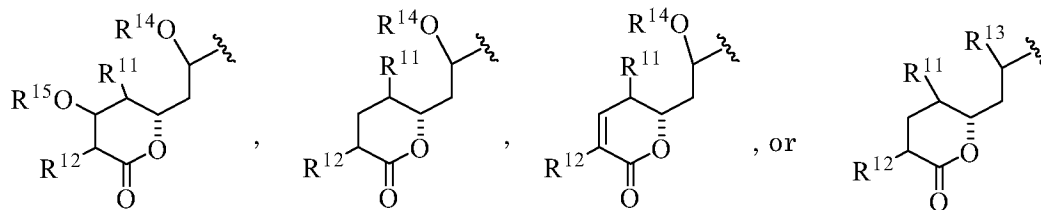
Claim 20 (original) The process of claim 1, wherein  $R^{14}$  and  $R^{15}$  are, independently, *tert*-butyldimethylsilyl or methoxymethyl.

Claim 21(original) The process of claim 1, wherein  $R^{25}$  is *para*-methoxybenzyl.

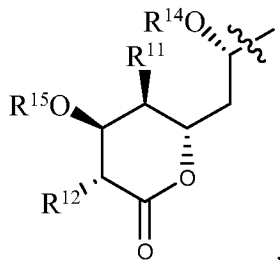
Claim 22 (original) The process of claim 1, wherein J is



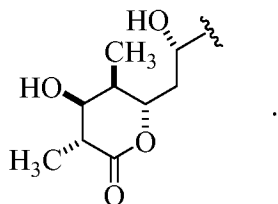
Claim 23 (original) The process of claim 1, wherein J is



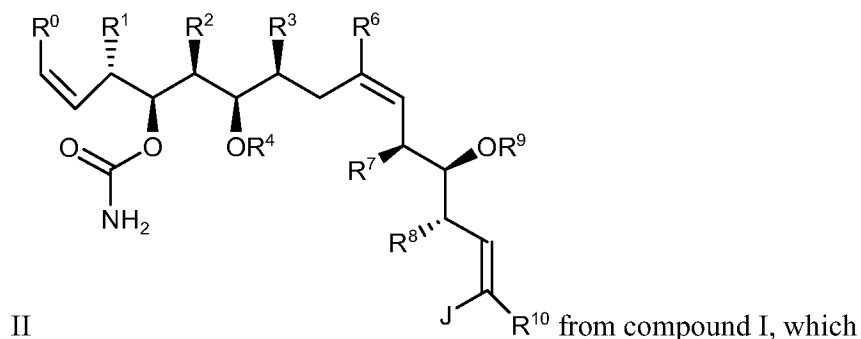
Claim 24 (original) The process of claim 1, wherein J is



Claim 25 (original) The process of claim 1, wherein J is



Claim 26 (original) The process of claim 1, further comprising a step of synthesizing  
a compound of formula II



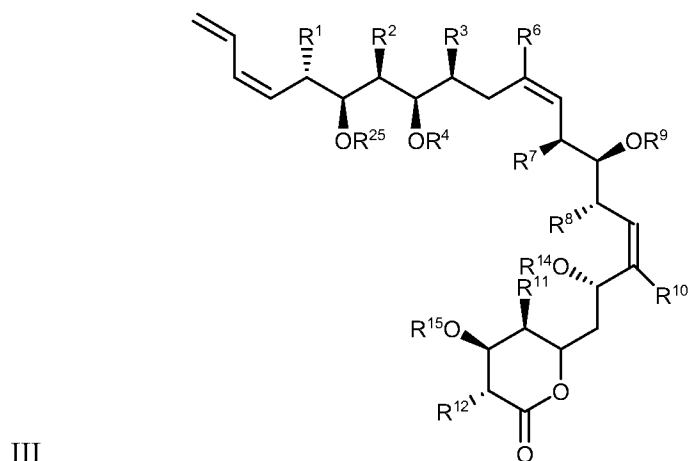
comprises

contacting the compound of formula I with an oxidizing agent to form a  
 deprotected compound, and  
 contacting the deprotected compound with  $\text{Cl}_3\text{CCONCO}$  in the presence of a  
 hydrolyzing agent.

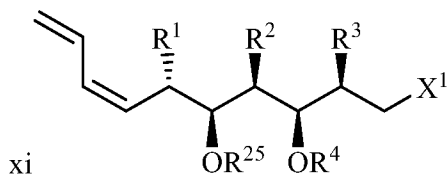
Claim 27 (original) The process of claim 26, wherein the oxidizing agent is 2,3-dichloro-5,6-dicyano-1,4-benzoquinone.

Claim 28 (original) The process of claim 26, wherein the hydrolyzing agent is  $\text{Al}_2\text{O}_3$ .

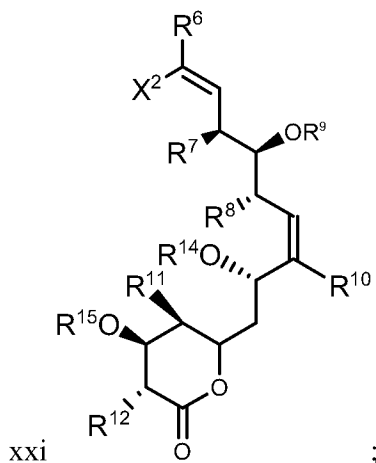
Claim 29 (original) A process for synthesizing a compound of formula III



comprising contacting a diene of formula xi



with a lactone of formula xxi



wherein  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^6$ ,  $R^7$ ,  $R^8$ ,  $R^{11}$ , and  $R^{12}$  are, independently, H or  $C_1$ - $C_{10}$  alkyl;

$R^4$ ,  $R^9$ ,  $R^{14}$ , and  $R^{15}$  are, independently, an acid labile hydroxyl protecting

group;

$R^{10}$  is hydrogen or  $C_1$ - $C_6$  alkyl;

$R^{25}$  is hydrogen or an oxidation stable hydroxyl protecting group; and

$X^1$  and  $X^2$  are, independently, a halogen, triflate, tosylate, or mesylate.

Claim 30 (original) The process of claim 29, further comprising

subjecting the process to the presence of a catalytically effective amount of a cross-coupling metal catalyst.

Claim 31 (original) The process of claim 29, wherein the cross-coupling metal catalyst comprises nickel or palladium.

Claim 32 (original) The process of claim 29, wherein the cross-coupling metal catalyst is Pd(0).

Claim 33 (original) The process of claim 29, further comprising contacting the compound of formula xi with a metallating agent, wherein the metallating agent is a compound containing boron, zinc, tin or magnesium or aluminum.

Claim 34 (original) The process of claim 33, wherein the metallating agent is a compound containing boron.

Claim 35 (original) The process of claim 33, wherein the metallating agent is MeO-9-BBN.

Claim 36 (Previously Presented) The process of claim 33, wherein the metallating agent is a compound containing zinc.

Claim 37 (original) The process of claim 33, wherein the metallating agent is ZnCl<sub>2</sub>.

Claim 38 (original) The process of claim 29, wherein at least one of X<sup>1</sup> and X<sup>2</sup> are iodine.

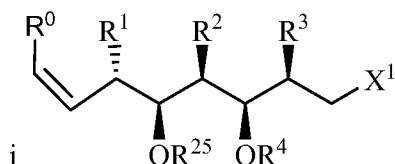
Claim 39 (original) The process of claim 29, wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>11</sup>, and R<sup>12</sup> are methyl.

Claim 40 (original) The process of claim 29, wherein R<sup>4</sup>, R<sup>9</sup>, R<sup>14</sup>, and R<sup>15</sup> are, independently, *tert*-butyldimethylsilyl or methoxymethyl.

Claim 41 (original) The process of claim 29, wherein R<sup>10</sup> is hydrogen.

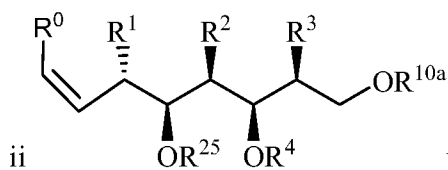
Claim 42 (original) The process of claim 29, wherein R<sup>25</sup> is *para*-methoxy benzyl.

Claim 43 (original) A process for synthesizing a halogenated alkylene of formula i



comprising:

contacting an alkenyl of formula ii



with a mild acid; and

adding to the process (X<sup>1</sup>)<sub>2</sub> in the presence of P(R<sup>18</sup>)<sub>3</sub>; wherein:

R<sup>0</sup> is C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, (CH<sub>2</sub>)<sub>r</sub>(C<sub>3-6</sub> cycloalkyl), (CH<sub>2</sub>)<sub>r</sub>(aryl)  
or (CH<sub>2</sub>)<sub>r</sub>(heterocycle), wherein r is 0, 1, 2, 3, or 4;

R<sup>1</sup>, R<sup>2</sup>, and R<sup>3</sup> are, independently, H or C<sub>1</sub>-C<sub>10</sub> alkyl;

R<sup>4</sup> is H or an acid labile hydroxyl protecting group;

R<sup>10a</sup> is a hydroxyl protecting group;

R<sup>18</sup> is C<sub>6</sub>-C<sub>14</sub> aryl;

R<sup>25</sup> is hydrogen or an oxidatively labile hydroxyl protecting group; and

X<sup>1</sup> is a halogen, triflate, tosylate, or mesylate.

Claim 44 (original) The process of claim 43 wherein R<sup>0</sup> is ethylene.

Claim 45 (original) The process of claim 43 wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are each methyl.

Claim 46 (original) The process of claim 43 wherein R<sup>4</sup> is *para*-methoxybenzyl.

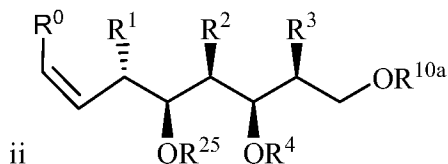
Claim 47 (original) The process of claim 43 wherein R<sup>18</sup> is phenyl.

Claim 48 (original) The process of claim 43 wherein R<sup>25</sup> is *tert*-butyldimethylsilyl.

Claim 49 (original) The process of claim 43 wherein X<sup>1</sup> is iodo.

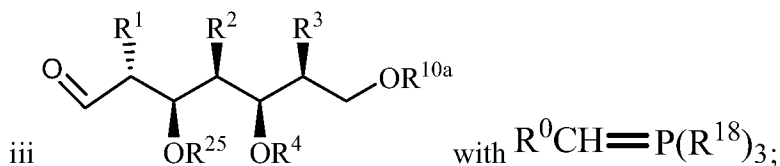
Claim 50 (original) The process of claim 43, wherein R<sup>10a</sup> is trityl.

Claim 51 (original) A process of synthesizing a compound of formula ii



comprising:

contacting an aldehyde of formula iii



wherein

R<sup>0</sup> is C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, (CH<sub>2</sub>)<sub>r</sub>(C<sub>3-6</sub> cycloalkyl), (CH<sub>2</sub>)<sub>r</sub>(aryl)  
or (CH<sub>2</sub>)<sub>r</sub>(heterocycle), wherein r is 0, 1, 2, 3, or 4;

R<sup>1</sup>, R<sup>2</sup>, and R<sup>3</sup> are, independently, H or C<sub>1</sub>-C<sub>10</sub> alkyl;

R<sup>4</sup> is H or an acid labile hydroxyl protecting group;

R<sup>10a</sup> is a hydroxyl protecting group;

R<sup>18</sup> is C<sub>6</sub>-C<sub>14</sub> aryl; and

R<sup>25</sup> is hydrogen or an oxidatively labile hydroxyl protecting group.

Claim 52 (original) The process of claim 51 wherein R<sup>0</sup> is ethylene.

Claim 53 (original) The process of claim 51 wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are each methyl.

Claim 54 (original) The process of claim 51 wherein R<sup>4</sup> is *para*-methoxybenzyl.

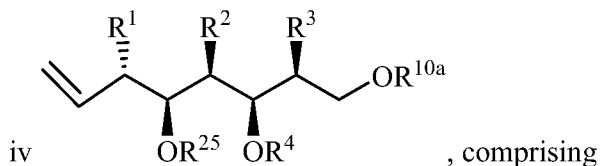
Claim 55 (original) The process of claim 51 wherein R<sup>18</sup> is phenyl.

Claim 56 (original) The process of claim 51 wherein  $R^{25}$  is *tert*-butyldimethylsilyl.

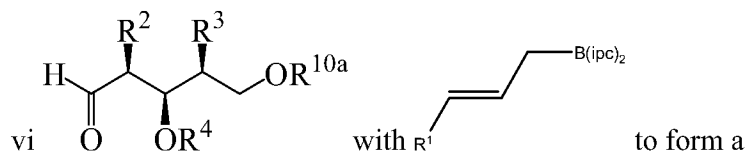
Claim 57 (original) The process of claim 51, wherein  $R^{10a}$  is trityl.

Claim 58 (original) The process of claim 52, wherein the compound of formula iii is contacted with allyldiphenylphosphine instead of  $R^0CH=P(R^{18})_3$ .

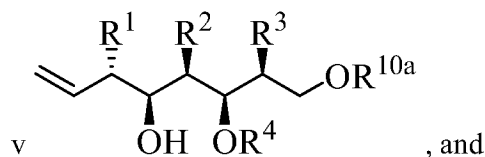
Claim 59 (original) A process of synthesizing a compound of formula iv

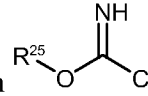


contacting a compound of formula vi



compound of formula v



reacting a compound of formula v with , wherein

$R^1$ ,  $R^2$ , and  $R^3$  are, independently, H or  $C_1$ - $C_{10}$  alkyl;

$R^4$  is H or an acid labile hydroxyl protecting group;

$R^{10a}$  is a hydroxyl protecting group; and

$R^{25}$  is hydrogen or an oxidatively labile hydroxyl protecting group.

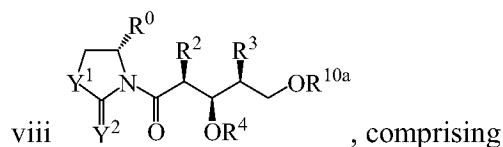
Claim 60 (original) The process of claim 59 wherein  $R^1$ ,  $R^2$  and  $R^3$  are each methyl.

Claim 61 (original) The process of claim 59 wherein  $R^4$  is *para*-methoxybenzyl.

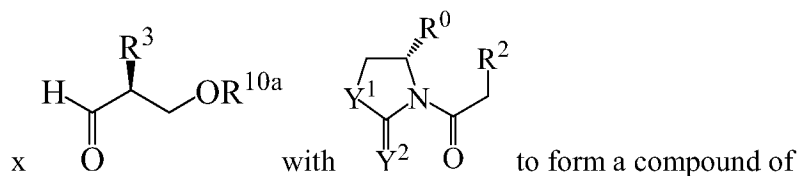
Claim 62 (original) The process of claim 59 wherein  $R^{25}$  is *tert*-butyldimethylsilyl.

Claim 63 (original) The process of claim 59, wherein  $R^{10a}$  is trityl.

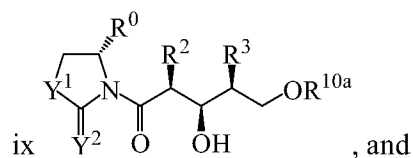
Claim 64 (original) A process of forming a compound of formula viii



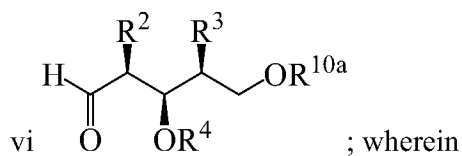
contacting a compound of formula x



formula



converting the compound of formula ix to a compound of formula vi



$R^0$  is  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $(CH_2)_r(C_{3-6}$  cycloalkyl),  
 $(CH_2)_r(aryl)$  or  $(CH_2)_r(heterocycle)$ , wherein  $r$  is 0, 1, 2, 3, or 4;

$R^2$  and  $R^3$  are, independently, H or  $C_1-C_{10}$  alkyl;

$R^4$  is H or an acid labile hydroxyl protecting group;

$R^{10a}$  is a hydroxyl protecting group; and

$Y^1$  and  $Y^2$  are, independently, O or S.

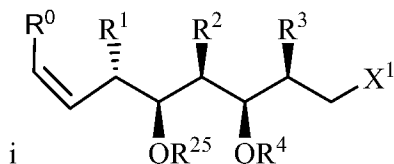
Claim 65 (original) The process of claim 64 wherein  $R^0$  is benzyl.

Claim 66 (original) The process of claim 64 wherein  $R^2$  and  $R^3$  are each methyl.

Claim 67 (original) The process of claim 64 wherein  $R^4$  is *para*-methoxybenzyl.

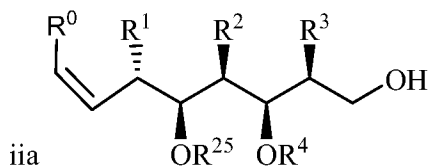
Claim 68 (original) The process of claim 64 wherein  $R^{10a}$  is trityl.

Claim 69 (original) A process for synthesizing a halogenated alkylene of formula i



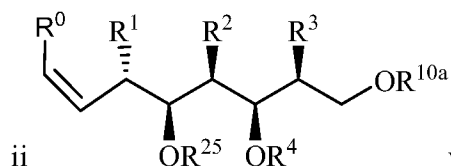
comprising,

contacting an alcohol of formula iia



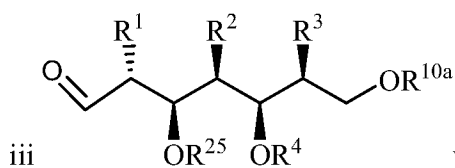
with  $(X^1)_2$  in the presence of  $P(R^{18})_3$ ;

yielding the compound of formula iia by contacting an alkylene of formula ii



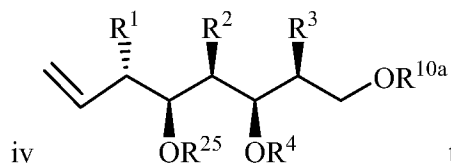
with a mild acid;

forming the compound of formula ii by contacting an aldehyde of formula iii



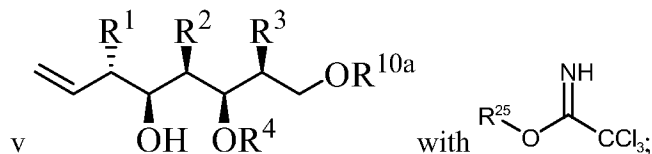
with  $R^0CH_2-P(R^{18})_3X^1$ ;

producing the compound of formula iii by subjecting a compound of formula iv

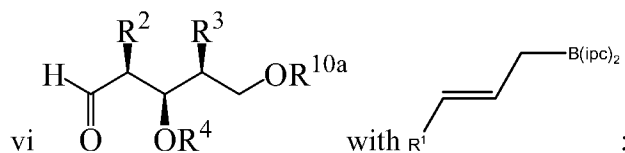


to ozonolysis.;

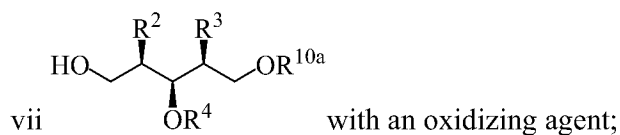
resulting in the compound of formula iv by contacting a compound of formula v



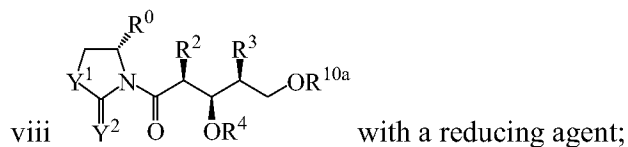
synthesizing the compound of formula v by contacting a compound of formula vi



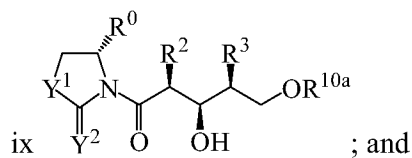
producing the compound of formula vi by contacting a compound of formula vii



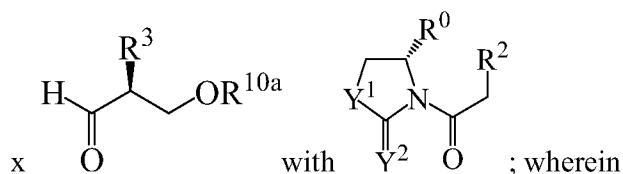
forming the compound of formula vii by contacting a compound of formula viii



synthesizing the compounds of formula viii and by protecting a hydroxyl moiety of a compound of formula ix



yielding the compounds of formula ix and ix' by contacting a compound of formula x



$R^0$  is  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $(CH_2)_r(C_{3-6} \text{ cycloalkyl})$ ,  $(CH_2)_r(\text{aryl})$

or  $(CH_2)_r(\text{heterocycle})$ , wherein  $r$  is 0, 1, 2, 3, or 4;

$R^1$ ,  $R^2$ , and  $R^3$  are, independently, H or  $C_1$ - $C_{10}$  alkyl;

$R^4$  is H or an acid labile hydroxyl protecting group;

$R^{10a}$  is a hydroxyl protecting group;

$R^{18}$  is  $C_6$ - $C_{14}$  aryl;

$R^{25}$  is hydrogen or an oxidatively labile hydroxyl protecting group;

$X^1$  is a halogen, triflate, tosylate, or mesylate; and

$Y^1$  and  $Y^2$  are, independently, S or O.

Claim 70 (original) The process of claim 69 wherein  $R^0$  is benzyl.

Claim 71 (original) The process of claim 69 wherein  $R^1$ ,  $R^2$  and  $R^3$  are each methyl.

Claim 72 (original) The process of claim 69 wherein  $R^4$  is *para*-methoxybenzyl.

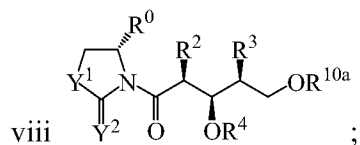
Claim 73 (original) The process of claim 69 wherein  $R^{18}$  is phenyl.

Claim 74 (original) The process of claim 69 wherein  $R^{25}$  is *tert*-butyldimethylsilyl.

Claim 75 (original) The process of claim 69 wherein  $X^1$  is iodo.

Claim 76 (original) The process of claim 69, wherein  $R^{10a}$  is trityl.

Claim 77 (Withdrawn) A compound of formula viii



wherein

$R^0$  is  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $(CH_2)_r(C_{3-6} \text{ cycloalkyl})$ ,  $(CH_2)_r(\text{aryl})$

or  $(CH_2)_r(\text{heterocycle})$ , wherein  $r$  is 0, 1, 2, 3, or 4;

$R^2$  and  $R^3$  are, independently, H or  $C_1$ - $C_{10}$  alkyl;

$R^4$  is H or an acid labile hydroxyl protecting group;

$R^{10a}$  is a hydroxyl protecting group; and

$Y^1$  and  $Y^2$  are, independently, S or O.

Claim 78 (Withdrawn) The compound of claim 77 wherein  $R^0$  is benzyl.

Claim 79 (Withdrawn) The compound of claim 77 wherein  $R^2$  and  $R^3$  are each methyl.

Claim 80 (Withdrawn) The compound of claim 77 wherein  $R^4$  is *para*-methoxybenzyl.

Claim 81 (Withdrawn) The compound of claim 77 wherein  $R^{10a}$  is trityl.

Claim 82 (Withdrawn) The compound of claim 77 wherein at least one of  $Y^1$  and  $Y^2$  is S.

Claim 83 (Withdrawn) The compound of claim 77 wherein at least one of  $Y^1$  and  $Y^2$  is O.